What is claimed is:

1. A Taylor reactor (101, 201, 301, 401) having a reactor housing (103, 203, 303, 403), having a rotor (104, 204, 304, 404) which is disposed in the volume enclosed by the reactor housing (103, 203, 303, 403) and is rotatable about an axis, having a reaction volume (102, 202, 302, 402) formed between the inner periphery of the reactor housing (103, 203, 303, 403) and the outer periphery (104.3, 204.3, 304.3, 404.3) of the rotor (104, 204, 304, 404), having at least one inlet (108.1, 208.1, 308.1, 408.1) for the reactants and/or process media and having at least one outlet (110, 210, 310, 410) for the reaction products, disposed in the direction of the axis (A) at a distance from the inlet (108.1, 208.1, 308.1, 408.1), **wherein** the reactor housing (103, 203, 303, 403) and/or the rotor (104, 204, 304, 404) are equipped such that the cross section of the reaction volume (102, 202, 302, 402) initially rises from the inlet (108.1, 208.1, 308.1, 408.1) to the outlet (110, 210, 310, 410) but the rise in cross section does not increase at least over part of the length of the rotor (104, 204, 304, 404).

2. The Taylor reactor as claimed in claim 1, **wherein** the rotor (104, 204, 304, 404) is disposed concentrically in the reactor housing (103, 203, 303, 403).

3. The Taylor reactor as claimed in claim 1 or 2, **wherein** the reaction volume (102, 202, 302, 402) is of annular design.

4. The Taylor reactor as claimed in claim 3, **wherein** the reaction volume (102, 202, 302, 402) has a circular periphery.

5. The Taylor reactor as claimed in any of claims 1 to 4, **wherein** the decrease in the rise of the cross section of the reaction volume (102, 202, 302, 402) is continuous.

6. The Taylor reactor as claimed in any of claims 1 to 4, **wherein** the decrease in the rise of the cross section of the reaction volume (102, 202, 302, 402) is discontinuous.

7. The Taylor reactor as claimed in claim 6, **wherein** the reactor housing (103, 203, 303, 403) and/or the rotor (104, 204, 304, 404) have, in the direction of the axis (A), at least two sections whose inner periphery and/or outer periphery

form(s) different angles with respect to the axis (A).

8. The Taylor reactor as claimed in any of claims 1 to 7, **wherein** the ratio of the radius of the reactor housing (r_o) to the radius of the rotor (r_i) at least for part of the length of the reaction volume (102, 202, 302, 402) is <1.4.

9. The Taylor reactor as claimed in any of claims 1 to 8, **wherein** the rotor (104, 204, 304, 404) is cylindrical.

10. A Taylor reactor having a reactor housing (103, 203, 303, 403), having a rotor (104, 204, 304, 404) which is disposed in the volume enclosed by the reactor housing (103, 203, 303, 403) in such a way as to be rotatable about an axis (A), having a reaction volume (102, 202, 302, 402) formed between the inner periphery (103.1, 203.1, 303.1, 403.1) of the reactor housing (103, 203, 303, 403) and the outer periphery (104.3, 204.3, 304.3, 404.3) of the rotor (104, 204, 304, 404), having at least one inlet (108.1, 208.1, 308.1, 408.1) for the reactants and/or process media, in particular as claimed in any of claims 1 to 9, **wherein** an outlet region (109, 209, 309, 409) which opens out into an outlet (110, 210, 310, 410) is provided which in the reactor housing

(103, 203, 303, 403) at one end face of the rotor (104, 204, 304, 404) adjoins the reaction volume (102, 202, 302, 402) and narrows to an outlet (110, 210, 310, 410) and **wherein** the end face of the rotor (104, 204, 304, 404) is designed such that the reaction volume (102, 202, 302, 402) opens out at least essentially without deadspaces into the outlet (110, 210, 310, 410).

11. The Taylor reactor as claimed in claim 10, **wherein** the end face of the rotor (104, 204, 304, 404) is designed such that in the direction of the axis (A) the cross section of the outlet region (109, 209, 309, 409) is at least substantially constant.

12. The Taylor reactor as claimed in claim 10 or 11, **wherein** the reactor housing (103, 203, 303, 403) is configured such that the outlet region (109, 209, 309, 409) is in the shape of a funnel and the end face of the rotor (104, 204, 304, 404) is of conical design.

13. A Taylor reactor
having a reactor housing (503),
having a rotor (504) which is disposed in the volume enclosed by the reactor housing (503) in such a way as to be rotatable about an axis (A),
having a reaction volume (502) formed between the inner periphery (503.1) of the reactor housing

(503) and the outer periphery (504.3) of the rotor (504), having at least one inlet (508.1) for the reactants and/or process media and having at least one outlet (510) for the reaction products, in particular as claimed in any of claims 1 to 12, **wherein** the outlet (510) opens out into the reaction volume (502) at a radial distance from the axis (A).

14. The Taylor reactor as claimed in claim 13, **wherein** the outlet (510) opens out transversely, preferably perpendicularly, to the axis (A) into the reaction volume (502).

15. The Taylor reactor as claimed in claim 13 or 14, **wherein** the region (B) of the rotor (504) that is adjacent to the outlet (510) comprises means for generating a circulation flow around the axis (A).

16. The Taylor reactor as claimed in claim 15, **wherein** the region (B) of the rotor (504) that is adjacent to the outlet (510) is designed in the manner of a centrifugal pump rotor.

17. A process for converting substances, where the kinematic viscosity ν of the reaction medium increases in the flow direction of the reactor, **which comprises** using therefor a Taylor reactor as claimed in any of claims 1 to 16.

18. The use of a process as claimed in claim 17 for preparing polymers, copolymers, block polymers, graft copolymers, polycondensates, polyadducts, core/shell lattices, polymer dispersions, products of polymer-analogous reaction, such as esterification, amidation or urethanization of polymers containing side groups suitable for such reactions, olefinically unsaturated materials curable with electron beams or ultraviolet light, or mesophases.

19. The use of the substances prepared by the process of claim 17 as components of moldings, films, coating materials, especially paints, adhesives, and sealants.